

India Distributed Energy Generation Market Assessment, By Technology (Diesel and Oil Gensets, Natural Gas Gensets, Mini Hydropower Grids, Gas & Steam Turbine, Fuel Cells, Solar Photovoltaic, Wind Turbine, and Biomass Generators), By End-user (Residential, and Commercial and Industrial), By Region, Opportunities, and Forecast, FY2017-FY2031

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Abstracts

India had been witnessing some notable developments in its Distributed Energy Generation Market which is projected to reach USD 33.54 billion by FY2031 from USD 12.60 billion in FY2023 growing at a CAGR of 13.02% during the forecast period. Factors driving the growth of distributed energy generation in India include government efforts to increase solar capacity, the rising popularity of biomass and biogas in rural areas, and declining costs of renewable technologies which has made it a viable and affordable option.

Moreover, India has abundant renewable energy resources, including solar, wind, biomass, and hydropower. Distributed energy generation systems, such as rooftop solar panels, allow individuals, businesses, and communities to harness these renewable sources and generate their own electricity in India. As per Renewable Energy Ministry data, more than 1000 MW of rooftop solar capacity has been added by the Indian government over the last 6 months. Moreover, rooftop solar capacity of 8877 MW (Megawatt) was added on March 31st, 2023, which is higher as compared to 7520 MW on September 30th, 2022. It also elucidated that the rooftop solar PV addition have significantly increased in India over the past couple of years with an average installation capacity exceeding 2 GW (Gigawatts) till date which is more as compared to 1.3 GW during FY2020 and FY2021. This, in turn, has made the country hold a dominant



position in the field of distributed solar energy generation capacity.

Increase of Renewable Energy Access in Rural Areas:

Distributed energy generation has emerged as a solution to address energy access challenges in rural areas of India. Energy access in rural areas of India has been a persistent challenge due to the limited reach of traditional centralized grid infrastructure. However, distributed energy generation has emerged as a feasible solution to address this issue. Off-grid systems, and solar water pumps powered by renewable energy sources such as solar power, are being deployed in rural communities to provide reliable and sustainable electricity thereby enabling economic growth and improving quality of life in rural areas. As of January 31, 2022, the Ministry of New and Renewable Energy (MNRE) reported that India had established standalone power plants with a combined capacity of 216 MW. These off-grid power plants operate independently and are not connected to the centralized grid. Additionally, there are 10 million solar-based lighting systems, including streetlights, home lights, and solar water pumps installed. When combined, these installations have contributed to a total installed capacity of 1,467 MW in India, as per the MNRE data.

Significant Development in the Hydropower Sector

The Indian government has implemented various policies and initiatives to promote hydropower development, including small-scale hydropower projects. These initiatives aim to tap into the hydropower potential of rivers, streams, and canals across the country and promote distributed energy generation. For example – Kallada Hydro Electric Project, Kerela - The Kallada power station makes use of the water discharge from the Kallada Irrigation Reservoir. It is the first power station in Kerala that utilizes water released for irrigation purposes to generate electricity. The dam is under the ownership of the Irrigation Department. Once electricity is generated, the water from the power station is released back into the Kallada River. During irrigation seasons, the water is diverted to an irrigation canal through a diversion weir. The power generated at the station is then transmitted through two 66 kV feeders for distribution and utilization.

Government Regulations

The Ministry of Power, Government of India initiated the implementation of the Integrated Power Development Scheme (IPDS) with the goal of enhancing the subtransmission and distribution network in urban regions, installing meters for distribution



transformers, feeders, and consumers in urban areas, integrating information technology in the distribution sector, and reinforcing the distribution network in accordance with the targets set under the Restructured Accelerated Power Development and Reforms Programme (R-APDRP) approved by Cabinet Committee on Economic Affairs (CCEA). The program will contribute to reducing AT&C (Aggregate Technical and Commercial) losses in power distribution network . Hence, it can be delineated that the schemes introduced by the Indian government are fuelling the market growth extensively. Moreover, the government has also announced that it is planning to increase its power generation and distribution capacity to a great extent so that the country becomes one of the best in distributed energy generation worldwide in future with the help of renewable energy resources.

Wider Availability of Biomass

Biomass plays a vital role in India's energy generation as a crucial resource. It offers renewable energy, is abundantly accessible, environmentally friendly, and holds immense potential for creating employment opportunities in rural regions. India, a country that faces significant environmental concerns due to uncertain climatic conditions, may witness a reduction in greenhouse gas emissions with renewable sources being used for energy generation. With the advancement of technology, thermal power plants have witnessed significant improvements in their efficiency and cost-effectiveness. India has embraced the practice of co-firing biomass in thermal power generation. Since the mid-nineties, India has implemented a biomass power and co-generation program, resulting in the installation of over 800 projects involving biomass power and bagasse/non-bagasse cogeneration to contribute power to the national grid.

Impact of COVID-19

The pandemic led to disruptions in global and domestic supply chains, affecting the availability of components and equipment necessary for distributed energy projects. This resulted in delays and increased costs for project development in the country. Moreover, due to lockdown measures and restrictions on movement, project installations and construction activities were significantly delayed. This led to a slowdown in the deployment of distributed energy systems, including rooftop solar installations and mini-grids. Furthermore, the economic impact of the pandemic, including reduced business activity and income, made it difficult for individuals and businesses to invest in distributed energy systems. Financing options became limited,



and many projects faced funding challenges or had to be put on hold thereby hampering the overall market growth rate.

Key Players Landscape and Outlook

The growing distributed energy generation market in India has prompted Indian companies to recognize the significance of maintaining their market share and expanding through a focus on solar cell manufacturing, brand positioning, and collaborations. These firms are dedicating more resources to research and development, marketing, and expanding their distribution networks. Moreover, Indian manufacturers are actively studying consumer behavior to better understand their needs and preferences, continually introducing new products to meet evolving demands.

On March 10th, 2023, Tata Power Renewable Energy Limited (TPREL), a wellknown company specializing in renewable energy in India and a subsidiary of Tata Power, has recently engaged in a Power Purchase Agreement (PPA) with the Tata Power Delhi Distribution Ltd. The PPA pertains to a hybrid project with a capacity of 510 Megawatts (MW). This initiative is anticipated to lead to an average annual decrease of 1540 metric tons of CO2 emissions for Tata Power-DDL, which is a partnership between Tata Power and the Government of Delhi. Tata Power-DDL is responsible for supplying electricity to a population exceeding 7 million in North Delhi.

On Jan 3rd, 2023, a Mumbai-based solar panel manufacturer, Waaree Energies, announced its plans to include solar cell manufacturing in its portfolio by the conclusion of the fiscal year 2023-2024. The company has revealed that it already has a pipeline of 5.4 gigawatts (GW) of solar cell capacity addition which will aid the distribution of solar power in the country. Furthermore, the recent acquisition of Indosolar is expected to support this expansion effort.



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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work



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